

## IN THE SPECIFICATION

Page 6, line 15: delete "outlet";

line 15: amend "connections" to read: "connection";

line 18: delete "removable";

line 20: delete "removable";

Page 7, line 10: insert:

"Fig. 27 shows a perspective view of a fragment of the internal return bend of semi-circular corrugated shape.

Fig. 28 shows a partial perspective view of the internal return bend of semi-octagonal shape.

Fig. 29 shows a transitional means at the inlet pipe connection.

Page 9, line 14: after "are" insert: "permanently";

Page 10, line 3: amend "doors" to read: "door";

Page 11, line 10: after "fixed" insert: "between sheets 12 as shown on Fig. 1";

line 10: delete "removable";

line 10: after "or" insert: "permanently fixed to the inner surface of the door 20";

line 11: amend "Fig. 20" to read: "Fig. 21";

Page 12, line 3: amend "the " to read "The";

line 11: after "configuration" insert: "as shown on Figures 28 and 27 respectively";

line 15: amend " Fig. 26" to read: "Fig. 8";

line 19: after " channels." insert: "Fig. 26 shows another modification of the

configuration of the internal return bend having a semi-circular step-like shape. Those bends are continuous and are permanently fixed to the inner surface of the door 20 in the same manner as shown on Fig.20."

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Page 13, line 6: amend "18 and 19" to read: "18, 19 and 29";

#### GENERAL COMMENTS

1. The Applicants submits missing drawings (Fig 27 and 28) showing other modifications of the internal return bends which were mentioned in the original specification on page 12, line 10 and covered by claims 14 and 15. Newly submitted Fig. 29 shows transitional means mentioned in claim 20 of the original specification and consisting of two pipe connections similar to Figs 18 and 19, which are connected to the inlet pipe connection 30 in series which is working as a physical barrier to avoid blockage happening inside the heat exchanger. This function of transitional means is also mentioned on page 13, lines 5-9 of the original specification.
2. Description of internal return bends of Fig. 20 and 21 had been amended, since even though those internal bends are not fixed permanently between the sheets 12 as on Fig. 1, but they are fixed permanently to the inner surface of the door 20. This fact was mentioned in the original description on page 9, lines 14-15. By this amendments the Applicant had removed contradiction issue mentioned in the Office Action on page 3, line 3. As the result, those Figures 20 and 21 also show permanently fixed internal return bends, which may be considered to be related to the same species as permanently fixed bends of Fig. 1.

3. The Applicant respectfully disagrees with the Examiner that the application does not have any broad claims covering both modifications, such as permanently fixed internal return bends of Fig. 1, 20, 21 and 26 and removable internal return bends shown on Figures 8, 24 and 25. Originally filed claims 1- 4 did not actually specify how those internal return bends were connected to the structure, and only dependent claims 5 and 9 are specifically drawn to those different practical embodiment.

4. The disclosure has been amended and all informalities were eliminated.

5. All claims have been amended to bring them in compliance with U.S.C. para. 112, second paragraph.

6. The applicants submits that amended claims 23-24, 27, 28 and 41 are patentable over Ahlberg and overcomes rejection under 35 U.S.C. # 102 in view of the following differences between those structures:

a. Ahlberg shows a structure wherein hot and cold fluids are conducted in a cross and counter-flow fashion (page 2, line 29), while the present structure conducts fluids in inline and counter flow, which is impossible with Ahlberg structure.

b. Ahlberg is describing and claiming four doors (claim 2, line 6; page 2, line 11 of the enclosed copy of the corresponding PCT publication), wherein those doors comprise boxes F incorporating

external return bends (see Fig. 1), while the present structure has only two oppositely located doors of substantially flat configurations without any external return bends. Thus, Ahlberg describes a very different configuration of doors and external return bends.

c. Ahlberg shows ducts (Fig. 1) spaced at the right angle to each other (page 3, line 17), wherein ducts of the present structure are parallel to each other.

d. Duct walls of Ahlberg are detachable (page 2, line 31), wherein the present structure is provided with directional baffles which are welded at the bottom of sheets 12, thus providing very strong structure capable to withstand very high pressure due to higher percentage of solids in the liquid. Besides, directional baffles are provided with the pressure relief holes to assure operation of the structure at higher pressure.

e. Ahlberg structure is clamped by means of framework on all four sides (page 3, line 30), while present structure is welded permanently with fixed top and bottom and 2 doors bolted to the frame, which allow to make very strong structure operating under very high pressure. The present structure does not need any assembly as is required by Ahlberg, and as a result, is more rigid and withstands very high pressures. This is impossible with Ahlberg.

f. Ahlberg has the layers or sheets just clamped to each other, and present structure is provided with layers welded on 2 sides to provided rigidity.

g. Ahlberg uses 4 doors to clean ducts, while the present structure has only 2 doors.

h. Ahlberg uses ducts or partitions arranged in the form of alternatives shown on Fig. 2 or 3 (page 3, line 33), and those partitions are fixed on each layer, wherein in the present structure, each layer has one end fixed and the other end open (Fig. 1), or removable (Fig. 8) to allow cleaning inside the channels.

i. None of Ahlberg modifications show external or internal return bends having a configuration providing increased turbulence flow, which in turn increases the heat transfer efficiency. For example, Fig. 1 of Ahlberg suggests that external boxes F have embedded circular channel design inside E; Fig. 2 does not have internal return bends and Fig. 3 has a semi-circular (not hexagonal or step-like) configuration.

As a conclusion, the present invention has very different structure and as a result is not anticipated by Ahlberg in view of 35 U.S.C. #102.

7. In view of the differences of the present structure and Ahlberg mentioned above, even a combination of Ahlberg and Watabe will not bring a person skilled in the art to the present structure, since "permanently attached internal return bends" is not only one feature which makes the present invention different from Ahlberg. Besides, Watabe discloses a heat sink (not a heat exchanger for solids), and plates or walls 1 and 2 are actually just spacers formed pressing; they have no channels provided with directional baffles for carrying liquids as in present invention, and

as in conclusion, will be non-operable for the present purpose. Also Fig. 8 of Watabe shows that the heat sink has very miniature dimensions specially designed for electronic industry's application, which is not suitable to carry large quantities of liquids containing solids as required in the waste water treatment. There are no suggestions or any directions that Watabe may be used for conducting solids.

8. With relation to combination of Ahlberg and Nasser, the patent to Nasser is related to a sea water distillation apparatus, not a heat exchanger, and elements identified as LB are deflectors provided for deflecting condensed liquid to collect and flow water downwardly (para. 10, lines 5-10). Deflectors 306 and 310 are curved in the form of open ellipse, while deflectors 304 are curved in the manner of an angle with a short side and a long side. Thus, Nasser does not disclose any internal or external return bends having semi-hexagonal cross-section. Besides, those deflectors LB are provided for absolutely different purpose and there is nothing in the description suggesting to create turbulence, but only distilling or steaming by means of the deflectors 304 which is also act as centrifugal drip separators (para. 11, line 52). Also, Nasser shows tubular ducts formed between contacting projections of each adjacent pair of plates (para. 7, line 12), wherein the present structure is provided with horizontal flat sheets or layers. Thus, combining Ahlberg and Nasser will not bring the person skilled in the art directly to the present structure.

9. Regarding the Examiner's objections of Ahlberg in view of Carlson, the Applicant wishes to emphasize that the Carlson structure shows holes provided not for pressure relief as in present invention, but for absolutely different purpose. Carlson describes cells 4 having side walls 5

provided with apertures 6 provided for circulation of fluid between each adjacent cell to provide a continuous circulatory system (para. 2. lines 44-50)., while the present structure is using holes for pressure relief only if excessive pressure builds up in a channel because of blockage of the adjacent channel. There is no other purpose of apertures in Carlson except continuous circulation, and the complete structure is not provided at all for the purpose of conducting solids. Even if a person skilled in the art would have these two references in front of him, no directions are given or even suggested to arrive at a similar structure as the present invention.

10. Finally, a combination of Ahlberg and Dziedzic also will not bring a person skilled in the art directly to the present structure. Transitions 13a and 13b of Dziedzic are provided for providing adequate gas seal, but not for liquid under severe conditions, wherein in the present structure, those transitional means are provided for avoiding blockage of happening inside the heat exchanger, thus operating as a physical barrier. There is no such problem described or indirectly mentioned in Dziedzic. As a result, since this references is so remote from the present problem, it will be not employed in combination with Ahlberg, but most probably ignored by a person skilled in the art.

The Applicants submits that newly amended claims overcome objections under 35 U.S.C. #103, and the present structure is not obvious in view of any combination of Ahlberg with any other prior art references taken one by one or cumulatively.

In view of the above reasons, the Applicant submits that since the generic (readable on all species) claim is considered to be allowable, he therefore asks to add claims to additional species as provided by 37 CFR 1.141.

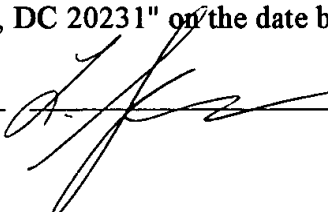
Respectfully submitted,



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I certify that this correspondence will be deposited with the United States Postal Services as first class mail with proper postage affixed in an envelope addressed to : "Commissioner of Patents and Trademarks, Washington, DC 20231" on the date below.

Date: 1995, Nov. 23  Patent Agent